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Global review of oil and gas fiscal regimes: lessons for Nigeria

ABSTRACT: The oil and gas sector remains the central mainstay of the Nigerian economy, contributing approximately 65% of government revenues and over 85% of total exports. Despite its abundant resources, the national fiscal framework faces deep-rooted inefficiencies, weak governance, and significant revenue volatility. This study evaluates petroleum fiscal regimes across five jurisdictions – Norway, Brazil, Saudi Arabia, Angola, and Guyana, using ten governance indicators to extract policy lessons for Nigeria. A rigorous comparative analysis reveals significant variations in state take, institutional autonomy, and regulatory efficiency.

Results indicate that Norway serves as the global benchmark, achieving a high 78% marginal tax rate and a sovereign wealth fund exceeding 1.4 trillion USD, supported by implementation scores of 9–10. In contrast, Guyana's recent reforms increased government take from 14.5% to approximately 27.5%, demonstrating successful frontier market evolution. Saudi Arabia provides a model for stability through a progressive sliding-scale royalty reaching 80% when oil prices exceed 100 USD/barrel.

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Conversely, Nigeria ranks lowest with scores between 4 and 5, and a critical low of 2 in environmental sustainability. The study concludes that to optimize the Petroleum Industry Act (PIA) 2021, Nigeria must adopt profitability-linked R-factor instruments similar to Angola to balance state returns with investor risk. Recommendations include granting full financial independence to the NUPRC and implementing green fiscal tools, such as carbon taxes, to enhance ESG compliance and align with global energy transition goals. This reform roadmap is vital for transforming Nigeria's hydrocarbon wealth into a driver for inclusive growth.

KEYWORDS: energy policy, fiscal system, energy governance, environmental sustainability, comparative evaluation

Introduction

Nigeria's oil and gas sector has historically played a central role in the country's economic growth and development, being the 12th-largest producer of oil globally and the largest in Africa, accounting for about 65 percent of government revenues and over 85 percent of its total exports (EITI 2025). Despite its abundant hydrocarbon resources, the country continues to suffer from deep-rooted inefficiencies resulting in investor apathy and weak governance frameworks that constrain the optimal value realization from its petroleum resources (Ali-Nakyea 2021; Sala-i-Martin and Subramanian 2013). Although fluctuations in global oil prices remain a challenge, Nigeria's oil exports continue to dominate its foreign earnings. According to OPEC (2023), Nigeria exports approximately 1.38 million barrels of crude oil per day and 32,190 million cubic meters of natural gas, valued at around 53.46 million USD. As the scale and scope of the country's petroleum transactions continue to grow, there is increasing attention on the regulatory environment, particularly the fiscal policies that shape investor decisions and government take.

Globally, the oil and gas industry is recognized not only for its economic significance but also for its ability to confer geopolitical leverage. Johnston (1994) argued that this sector represents a convergence of immense wealth and power, often marked by a striking imbalance between risk and reward. Nakhle (2008) further emphasized that this makes the industry uniquely attractive yet complex. Because of its strategic and economic importance, the oil and gas industry has become a cornerstone for both emerging and advanced economies (Raszewski and Gorski 2014). At the same time, the persistent global demand for energy poses a challenge for host governments to manage these resources efficiently and equitably. The need to balance national development goals, environmental considerations, and investor profitability has made the governance of petroleum resources increasingly complex (Kemp and Kasim 2006; Biang 2010; Daryanto 2017). Several countries, including Nigeria, face challenges such as weak revenue management, fiscal instability, pressure to fund large-scale projects, and vulnerability to external economic shocks (Lahn et al. 2007; Elumah et al. 2025).

One of the most critical instruments through which resource-rich countries manage these challenges is the Petroleum Fiscal Regime (PFR). This refers to the body of laws, agreements, and administrative practices that define how revenues from oil and gas exploration and production are shared between the state and investors (Hunter 2015; Manaf et al. 2016). A well-designed PFR not only reflects the economic and political priorities of a country but also plays a key role in shaping the investment climate. Van Alstine (2014) emphasized that the effectiveness of a fiscal regime lies in its ability to balance government revenues with investor returns, all within a framework that promotes transparency, adaptability, and competitiveness. Flexibility and clarity in fiscal arrangements are therefore crucial for attracting and sustaining long-term investment in the petroleum sector.

In an effort to reform its oil and gas governance architecture, Nigeria enacted the Petroleum Industry Act (PIA) in 2021. This landmark legislation marked the end of a 20-year effort to overhaul the legal and fiscal framework of the country's hydrocarbon industry (Elumah et al. 2025). The PIA seeks to streamline regulatory processes, increase government revenue, improve environmental management, and create a more attractive investment climate. Prior to the PIA, other significant fiscal reforms were introduced, such as the Deep Offshore and Inland Basin Production Sharing Contracts (Amendment) Act in 2019 and the Finance Act in 2020. These legislative instruments adjusted fiscal terms in response to market dynamics and investor concerns, laying the groundwork for the more comprehensive reforms contained in the PIA.

More recently, a range of fiscal incentives has been introduced to further stimulate investment and reposition Nigeria's oil and gas industry for global competitiveness. The Upstream Petroleum Operations (Cost Efficiency Incentives) Order, 2025, provides tax credits for operators who meet cost-saving benchmarks set by the Nigerian Upstream Petroleum Regulatory Commission (NUPRC). The VAT Modification Order of 2024 exempts strategic energy products and infrastructure, such as diesel, LPG, CNG, and LNG, from value-added tax, aiming to reduce operational costs and encourage cleaner energy adoption. In addition, the Deep Offshore Production Incentives scheme introduces fiscal reliefs for deepwater projects under production-sharing and profit-sharing contracts, including production tax credits. Gas utilization incentives have also been expanded to provide tax reductions for enterprises in remote or underdeveloped locations, thereby encouraging broader energy access and industrial development. These measures are designed to revitalize the sector, promote innovation, and align Nigeria's petroleum industry with global energy transition goals.

While these developments represent a positive shift, the evolving dynamics of the global petroleum landscape underscore the importance of drawing comparative lessons from other jurisdictions. A global review of fiscal regimes offers valuable insights for Nigeria as it seeks to improve its investment appeal and maximize returns from its hydrocarbon resources. Countries such as Norway, Brazil, Saudi Arabia, Angola, and Guyana provide instructive examples of how transparent, flexible, and well-structured fiscal regimes can support national development while maintaining investor confidence (Lund 2014; IMF 2023; Moshashai et al. 2018). These nations differ in their approaches to royalty structures, corporate taxation, production-sharing models, and sovereign wealth fund management, yet each has achieved relative success in aligning

fiscal regimes with broader development goals. Nigeria stands to benefit from analyzing these frameworks as it continues to implement the PIA and seek improvements in policy design and execution.

This study, therefore, reviews global oil and gas fiscal regimes and distills relevant policy lessons that Nigeria can adopt to enhance the sustainability, competitiveness, and efficiency of its petroleum sector. The timing of this review is particularly relevant given the ongoing implementation of the Petroleum Industry Act, which presents a critical window for fiscal recalibration and institutional reform in Nigeria's oil and gas governance landscape.

1. Methodology

This study adopts a qualitative, comparative review method aimed at examining global oil and gas fiscal regimes to identify relevant policy lessons for Nigeria. The approach involves an extensive desk-based review of secondary sources, including academic literature, policy documents, legal instruments, industry reports, and data from international organizations such as the International Monetary Fund (IMF), World Bank, OPEC, and national petroleum agencies. The study emphasizes a non-experimental, exploratory design, suitable for synthesizing broad policy experiences across multiple jurisdictions (Yin 2014; George and Bennett 2005; Patton 2002).

The comparative analysis focuses on a purposively selected group of petroleum-producing countries, namely Norway, Brazil, Saudi Arabia, Angola, and Guyana. These jurisdictions were selected to represent a diverse spectrum of market maturities and governance models, providing a comprehensive policy laboratory for Nigeria, as shown in Table 1. Specifically, Norway (Mature Model) was selected to demonstrate the impact of high institutional autonomy and the State's Direct Financial Interest (SDFI) on long-term wealth stability. Saudi Arabia (State-Dominant Model) was included to evaluate tiered royalty structures and the strategic role of a high-performing National Oil Company (NOC). Brazil and Angola (Emerging Models) were chosen for their innovative use of R-factor mechanisms and Production Sharing Contracts (PSCs) to manage high-risk, high-reward assets like pre-salt reserves. Meanwhile, Guyana (Frontier Model) serves as a contemporary case of rapid institutional evolution, moving from aggressive investor incentives to enhanced national take.

These case studies serve as benchmarks for analyzing core fiscal instruments such as royalty frameworks, production-sharing contracts, tax regimes, cost recovery mechanisms, and sovereign wealth fund utilization.

The review used in this study involves thematic content analysis, whereby each jurisdiction is evaluated along a set of criteria relevant to fiscal regime performance. These criteria include investment attractiveness, revenue generation capacity, transparency and accountability mechanisms, and alignment with energy transition goals. Fiscal stability is measured by the

TABLE 1. Petroleum fiscal management selection criteria

TABELA 1. Kryteria wyboru zarządzania fiskalnego ropą naftową

Country	Market maturity	State participation	Key fiscal instruments	Sovereign wealth fund
Norway	Mature market	High (via Equinor, Petoro)	Royalties, Taxes, SDFI	Government Pension Fund Global
Saudi Arabia	State-controlled	Very High (Aramco is state-owned)	Royalties, Direct Taxation, No PSCs	Public Investment Fund (PIF)
Brazil	Emerging market	Moderate-High (Petrobras involvement)	Royalties, PSCs (pre-salt), Special Participation Tax	Sovereign Fund of Brazil (limited activity)
Angola	Emerging market	Moderate (via Sonangol)	Royalties, PSCs, Cost Recovery Clauses	Oil Fund (limited transparency)
Guyana	Frontier market	Low (Exxon-led consortium)	Royalty + Tax Hybrid, Cost Recovery Cap, Profit Oil Sharing	Natural Resource Fund (recently established)

Source: Authors compilations

frequency of contract renegotiations and the transparency of licensing. Institutional Autonomy is evaluated based on the legal and financial independence of regulatory bodies while revenue management is assessed through the presence of rule-based disbursement systems and independent oversight of Sovereign Wealth Funds. The analysis also considers how host governments have adapted their fiscal policies in response to changing global dynamics, such as oil price volatility, climate-related pressures, and energy diversification imperatives.

Furthermore, the study utilizes a Comparative Governance Heatmap to visually synthesize the implementation of key petroleum fiscal governance principles across the selected jurisdictions. Each country is assigned a qualitative score from 0 to 10, where 9–10 represents performance aligned with global best practices, and 0–2 indicates governance failure or regulatory breakdown (Appendix A). To minimize bias and ensure scientific credibility, the data used was triangulated from three primary main sources: legal and statutory analysis, institutional data, and secondary literature. Direct review of national legislation, including Nigeria’s Petroleum Industry Act (PIA) 2021, Norway’s Petroleum Taxation Act, and Brazil’s Law No. 12,351. Reports from international organizations (IMF, World Bank, OPEC, EITI) and annual filings from National Oil Companies (Aramco, Petrobras, NNPC Ltd). Peer-reviewed academic research (2014–2024) providing critical evaluation of policy performance, respectively. Where quantitative data was limited, qualitative proxies such as fiscal transparency levels and legal enforceability of contracts were employed to ensure a balanced narrative.

For the Nigerian context, relevant statutes and policy documents, including the PIA, the Deep Offshore and Inland Basin Production Sharing Contracts (Amendment) Act, the Finance

Act, and recent fiscal incentive orders (2024–2025) were reviewed to understand the current fiscal landscape and the extent of ongoing reforms. The comparative insights generated are then used to draw policy-relevant lessons and offer context-sensitive recommendations tailored to Nigeria’s political economy and developmental objectives.

This methodological approach allows for a structured yet flexible framework for policy learning, ensuring that the study not only captures the complexity of global fiscal regimes but also presents actionable insights that can inform Nigeria’s fiscal strategy in the evolving global energy landscape.

2. Comparative analysis of selected country case studies

2.1. Norway’s petroleum fiscal regime: evolution and current framework

Norway’s petroleum fiscal regime has been transformed through strategic governance, deliberate institutional design, and proactive policy learning. The Ekofisk field discovery in 1969 triggered the establishment of a solid framework based on the principle that the Norwegian people own oil and gas resources, which must serve the needs of both current and future populations (Holden 2013; Norouzi and Ataei 2022). State-owned Equinor was established as Statoil in 1972, through which the Norwegian government-maintained oversight while developing domestic petroleum capabilities (Norouzi and Ataei 2022).

Additionally, the 1975 Petroleum Taxation Act established a dual-taxation system through ordinary corporate income tax and a petroleum surtax that ensured fair rent collection (Ali-Nakyea 2021). The SDFI was introduced in 1985 to enable state equity participation in petroleum licenses, generating additional revenues without requiring operational involvement (Hunter 2014; Lund 2014; Oprea 2024). The Government Petroleum Fund (now known as the Government Pension Fund Global) began operations in 1990 to safeguard oil revenues through long-term fiscal sustainability and mitigate Dutch disease, and support macroeconomic stability (Asdal and Lahn 2024; Mohn 2016; Norouzi and Ataei 2022).

Moreso, the fiscal rule adopted in 2001, maintained long-term stability by restricting the non-oil budget deficit to the projected real return of the Government Pension Fund Global (GPFG), which began at 4% and later decreased to 3% (Oprea 2024; Wirth and Ramírez-Cendrero 2016). The national budgeting process received fiscal prudence through this rule, which protected the economy from periodic economic ups and downs.

The petroleum fiscal framework of Norway stands as a leading worldwide example of fiscal management in the oil and gas sector. The country’s 78% marginal tax rate, which includes 22% ordinary corporate tax alongside 56% special petroleum tax, reflects an investment-neutral design that allows full immediate cost recovery and loss carryforward

with interest, as well as cash payments for exploration expenses (Lund 2014; Mohn 2016; Øvald et al. 2019; Oprea 2024). The Petroleum Price Board enforces norm-pricing for crude oil sales between related parties to prevent profit shifting and maintain tax fairness (Heiret and Innset 2025).

The state also maintains control through its majority stake in Equinor and Petoro's management of SDFI assets, which maintains alignment between commercial operations and public interest involvement (Cappelen and Mjøset 2009; Holden 2013; Kolstad and Wiig 2009). The GPF, valued at more than 1.4 trillion USD, operates under ethical investment guidelines and strict withdrawal protocols that reflect Norway's strong commitment to intergenerational equity (Asdal and Lahn 2024; Oprea 2024). Together, Norway's petroleum fiscal system demonstrates highly effective institutional capabilities, prudent resource management, and strategic longterm economic planning, providing a valuable model for resource-rich countries seeking sustainable revenue governance.

2.2. Brazil's petroleum fiscal regime: evolution and current framework

The petroleum fiscal governance system in Brazil was developed through a strategic combination of statist control along with liberal reforms and targeted institutional modifications. The national policy adopted the “O Petróleo é Nosso” ethos through the implementation of Law No. 2004 in 1953, which granted Petrobras exclusive control of upstream operations (Almada and Parente 2013; Pereira et al. 2017). During the mid-20th century, Brazil adopted this statist model to gain public backing for state control of resources, reflecting the broader Latin American developmental agenda of that era and securing public support for national ownership (Braga 2018). The oil price surges of the 1970s, together with worsening domestic economic conditions, increased the pressure for liberalization (Hernandez-Perez 2011).

Major reforms emerged in the 1990s, notably Constitutional Amendment No. 9 (1995) and the Petroleum Law No. 9478 (1997), which dismantled Petrobras' upstream monopoly, permitted foreign investment, and established the Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (ANP) as an autonomous regulator (de Medeiros Costa et al. 2021; Nishijima et al. 2020; Paz 2014; Trojczak and Segatto 2020). The reforms created a concession-based system that utilized competitive bidding rounds, royalties, signature bonuses, and special participation taxes as main fiscal instruments (McLean 2023).

The discovery of extensive presalt reserves in the Santos Basin in 2007 prompted significant regulatory changes. The Brazilian government implemented Law No. 12,351 in 2010 to introduce PSCs for ultra-deepwater strategic assets, as the concession model proved insufficient for managing such high-risk, high-value resources (Araújo and Leoneti 2019; Filho et al. 2019; Florêncio 2016). Under the new framework, the state retained ownership of subsalt resources and created Pré-Sal Petróleo S.A. (PPSA) to supervise contractual operations (Florêncio 2016). The government also established the “onerous assignment” regime, granting Petrobras direct access

to five billion barrels of presalt reserves in exchange for compensation to the state (Mariano et al. 2018).

Brazil now operates a dual-regime fiscal system that aligns geological risk profiles with specific contractual instruments. Under concession agreements, investors gain full ownership of produced oil once contractual obligations are met, with royalties set at a standard 10% and special participation taxes ranging from 10% to 40% for highly productive fields (McLean 2023; Postali 2009; Ramírez-Cendrero and Paz 2017). The PSC model governs the strategic presalt polygon by allowing contractors to recover 50–70% of their costs before profit oil is shared. Petrobras' previously mandated 30% stake was relaxed in 2016 to enhance investment attractiveness (da Hora et al. 2019; Ramírez-Cendrero and Paz 2017).

The onerous assignment mechanism serves as a third fiscal layer, applying PSC terms to surplus presalt volumes (Almada and Parente 2013; Mariano et al. 2018). The system also incorporates the CIDE fuel tax and specific social investment royalties earmarked for targeted development programs (KPMG 2011; Nunes 2024; Paz 2014). Despite strong institutional frameworks, oversight bodies such as ANP and PPSA face challenges in ensuring efficient cost recovery, maintaining operational transparency, and balancing regional equity outcomes (Braga 2018).

Overall, Brazil demonstrates adaptive resource governance through a petroleum fiscal regime that blends investment incentives with national development goals. Its system maintains contractual flexibility, fiscal diversity, and an evolving state–market relationship that continues to shape upstream competitiveness (Pereira et al. 2017, 2024).

2.3. Saudi Arabia's petroleum fiscal regime: evolution and current framework

The discovery of oil in 1938 led Saudi Arabia to establish its petroleum fiscal system. This system supports the national economy by balancing resource management, global market participation, and long-term development. Over time, taxation, royalties, and state participation shaped hydrocarbon governance, helping Saudi Arabia become OPEC's de facto leader and the world's largest crude oil exporter, as depicted by Alsweilem (2015), Bassam (2019), Malik and Masood (2020), Moshashai et al. (2018), and Wada and Tuna (2017).

Saudi petroleum governance began in 1933 when Standard Oil of California received a concession with low royalties and limited state oversight (Shammas 2000). After World War II, rising resource nationalism led to repeated renegotiations, culminating in the full nationalization of Aramco by 1980. This gave the state control over hydrocarbon operations and revenues (Jawadi and Ftiti 2019; Khorsheed 2015). During this period, oil income funded infrastructure and social programs under the 1963 Hydrocarbons Law and its amendments, which introduced taxation, licensing, and environmental rules (Moshashai et al. 2018; Trudelle 2023, 2024).

Recent reforms under Vision 2030 aim to diversify fiscal sources and improve government transparency (Abid and Alotaibi 2020; Al Naimi 2022; Almutairi et al. 2022; Faudot 2019; Hasanov et al. 2022; Trudelle 2024; Young 2016). The 2019 partial privatization of Aramco introduced new royalty terms and stricter disclosure requirements (IMF 2022). Today, Saudi Arabia applies a sliding royalty scale: 15% below 70 USD per barrel, 45% between 70 and 100 USD, and 80% above 100 USD (IMF 2024). This system stabilizes fiscal revenues during price swings.

In 2017, Aramco's corporate tax rate was reduced from 85% to 50% to enhance competitiveness before its IPO (IMF 2019). While joint ventures exist, Aramco dominates upstream operations. State dividends, both fixed and performance-linked, remain its main revenue source (IMF 2024). Through the Public Investment Fund (PIF), surplus oil revenues are invested in global markets and domestic projects to support fiscal policy and diversification goals (Abid and Alotaibi 2020; Nakhle 2017; Tagliapietra 2019; Trudelle 2023).

To diversify non-oil revenues, Saudi Arabia introduced VAT at 5% in 2018, later raised to 15% in 2020, along with excise taxes (Almutairi et al. 2024; Baum et al. 2025; Ezenagu 2021; IMF 2022). Combined with the Fiscal Sustainability Program and energy efficiency mandates, these reforms highlight the country's commitment to strong macro-fiscal governance.

Overall, Saudi Arabia's petroleum fiscal regime has evolved from concessionary colonial arrangements to a modern, flexible framework that supports economic stability while advancing diversification and resilience goals (Jawadi and Ftiti 2019; Trudelle 2024).

2.4. Angola's petroleum fiscal regime: evolution and contemporary framework

After independence in 1975, Angola made petroleum the backbone of its economy. Its fiscal system evolved in response to political, economic, and institutional changes (Opong et al. 2016; Ovadia 2012; de Sousa Penelas et al. 2023; Shaxson 2021). When Sonangol was created in 1976, the country embraced resource nationalism, giving the state control over hydrocarbon operations to assert sovereignty over natural resources (Asanga et al. 2021; Echendu et al. 2015; Fjeldstad et al. 2020; Flanders Investment & Trade 2021). Production Sharing Contracts (PSCs) became the preferred fiscal model in the 1980s–1990s, allowing the state to oversee exploration and production while attracting foreign capital (Echendu et al. 2015).

Early PSCs gained traction but faced challenges, including unclear fiscal terms and poor risk–reward balance. The 2004 Petroleum Activities Law introduced new fiscal tools, most notably the R-factor mechanism, which adjusts profit-sharing between the government and investors based on project profitability (Asanga et al. 2021; Enyoghasim and Agwu 2018; Ovadia 2012; de Sousa Penelas et al. 2023). Angola also joined the Extractive Industries Transparency Initiative (EITI) in 2009, signaling its commitment to global standards while improving domestic governance (Fjeldstad et al. 2020).

Angola's economy remained highly vulnerable to oil price fluctuations. Between 2004 and 2014, petroleum revenues accounted for 80% of fiscal income, exposing structural weaknesses (Ovadia 2012). Non-oil tax reforms in 2011 achieved limited diversification, as dependence on petroleum exports persisted (Fjeldstad et al. 2020). Governance shortcomings, revenue losses, and weak oversight continued to hinder the developmental potential of oil wealth.

Today, Angola retains PSCs as the core of its petroleum fiscal regime but has added modern royalty and taxation instruments to encourage investment and stability (Echendu et al. 2015; de Sousa Penelas et al. 2023). The cost recovery system distinguishes “cost oil” from “profit oil,” with profit shares distributed through the R-factor mechanism (Enyoghasim and Agwu 2018; Silva and Frazão 2016). Recent reforms reduced the Petroleum Income Tax from 65.75% to 55.75% and lowered some royalty rates to 15% to attract investment in mature fields (Energy Capital & Power 2025).

Sonangol, the national oil company, holds a mandatory 20% stake in all operations, while the National Oil, Gas, and Biofuels Agency (ANPG) serves as the regulator (Flanders Investment & Trade 2021; Silva and Frazão 2018). The government also enforces local content requirements and offers incentives to extend asset lifespans (Ovadia 2012, 2013, 2014; Teka 2012). Ongoing diversification efforts aim to strengthen macroeconomic stability and improve resource management (Fjeldstad et al. 2020).

2.5. Guyana's petroleum fiscal regime: evolution and emerging framework

Guyana's shift from an agricultural economy to a petroleum producer marks one of the most significant energy transitions in a developing country (Bhattacharya 2022; Chang 2025; Elias-Roberts 2020; Hartless 2023; Rambarran 2021). The discovery of large hydrocarbon reserves in the Stabroek Block in 2015 transformed Guyana into a rising player in global petroleum markets (Alleyne et al. 2018; Azubike 2020; Bynoe and Simmons 2021; IMF 2018; John 2024; Shapovalova 2020; Wenner et al. 2018). Alongside this, the fiscal system developed to balance foreign investment attraction with national interest (Azubike 2020).

The 2016 Production Sharing Agreement (PSA) set initial terms of a 2% royalty, 75% cost recovery, and a 50:50 profit oil split. These terms encouraged investment but were criticized as overly favorable to international oil companies (Alleyne et al. 2018; Bulkan and Trotz 2021; IMF 2018; Mangal 2019; Stabroek News 2021; Vargas and Quintana 2015). In 2022, Guyana revised the framework, raising royalties to 10%, limiting cost recovery to 65%, and adding a 10% corporate tax. Government revenue increased from 14.5% to 27.5%, reflecting stronger institutional capacity and national control (IMF 2023; Valle 2024).

In 2023, Guyana introduced a model PSA to standardize contract terms and improve transparency (IMF 2023, 2025; NRGi 2021). The fiscal framework now includes four key

elements: a 10% royalty, a 50:50 profit oil split, a 65% cost recovery cap, and a 10% corporate income tax (Balza et al. 2020; IMF 2023).

The Natural Resource Fund (NRF), established in 2019 and revised in 2021, is central to Guyana's resource governance. It is overseen by a Board of Directors and two committees: the Public Accountability and Oversight Committee and the Investment Committee (Ali and Schena 2017; Balza et al. 2020; Bynoe and Simmons 2021; IMF 2023; World Bank 2023). Transparency is reinforced through parliamentary reporting and disclosure of capital inflows (IMF 2023).

Guyana also passed the Local Content Act in 2021, requiring the participation of nationals and domestic firms in petroleum operations. The Act sets employment and procurement targets to strengthen local capacity and economic linkages (Baluch and Rambarran 2019; IMF 2023).

Despite oil development, Guyana remains carbon-negative by protecting 86% of its land through forest reserves while pursuing sustainable resource use (Elias-Roberts 2020). International observers note progress in regulation and climate integration, though challenges remain (Khadan and Baxter 2018; NRG 2021; Panelli 2019; Valle 2024; World Bank 2023). Guyana's example shows that new oil-producing nations can design governance systems that balance transparency, sustainability, and fair stakeholder treatment.

Table 2, as shown above, provides a comparative description of the petroleum fiscal regimes dimensions in Norway, Brazil, Saudi Arabia, Angola, and Guyana, across eight (8) dimensions focusing on royalty structures, corporate and special taxes, cost recovery mechanisms, and revenue-sharing models. This comparative overview reveals the diversity of fiscal instruments employed to balance government revenue generation with investor appeal. The data reveals three distinct strategic approaches to petroleum fiscal management:

The High-Participation Taxation Model (Norway): Norway utilizes a system that lacks traditional royalties but imposes a significant 71.8% Special Petroleum Tax in addition to a 22% corporate income tax. This results in a high 78% government take, which is further supported by substantial state equity participation via Equinor and the State's Direct Financial Interest (SDFI).

The Progressive Royalty-Tax Model (Saudi Arabia): Saudi Arabia employs a highly sensitive, tiered royalty structure that scales based on global oil prices, ranging from 15% when prices are below 70 USD/barrel to 80% when prices exceed 100 USD/barrel. This mechanism ensures the state maximizes revenue during market peaks while providing fiscal relief during price troughs.

The Adaptive Production Sharing Model (Brazil, Angola, and Guyana): These jurisdictions utilize Production Sharing Agreements (PSAs) to mitigate investor risk and manage strategic assets. Brazil and Angola incorporate R-factor mechanisms or sliding scales based on the Internal Rate of Return (IRR), ensuring the government's share of profit oil increases as project profitability grows.

The comparative overview further demonstrates the causal relationship between geological risk and fiscal stringency. Guyana's pre-2023 regime featured the lowest government take at 14.5% to attract initial investment in an unproven basin, but its recent transition to a 10% royalty and 10% corporate tax reflects a strategic evolution as it becomes a proven petroleum province. Additionally, emerging markets like Brazil allow high cost-recovery ceilings of up to 80% to

TABLE 2. Comparative fiscal regimes in the oil and gas industry of selected countries
TABELA 2. Porównawcze systemy podatkowe w branży naftowo-gazowej wybranych krajów

Dimensions	Country				
	Norway	Brazil	Saudi Arabia	Angola	Guyana
1	2	3	4	5	6
Fiscal regime type	State participation and taxation	Concession and production sharing	Concession and taxation	Production Sharing Agreements (PSAs) and conventional tax-and-royalty frameworks	Production Sharing Agreement (PSA)
Royalty rate	N/A	Concession – 5% to 10% Production sharing –15%	Tiered royalty structure. 15% at oil price below 70 USD/barrel 45% at oil price between 70–100 USD 80% at oil price above 100 USD/barrel	Colloquially known as the Petroleum Production Tax, and ranges from 10% to 15%, depending on the field's characteristics.	2%, prior to 2023. 10%, 2023 and beyond
Corporate Income Tax (CIT)	22%	34% (15% basic rate plus a surtax of 10% plus 9% social contribution tax on profits (CSLL))	85% before 2017 50% 2017 and beyond	25%	0%; before 2023 (paid on behalf by the Govt). 10% on the contractor's profit, 2023 and beyond
Special taxes	Special Petroleum Tax of 71.8%	A quarterly Special Participation Tax (SPT) of 10–40% applicable to Concessionaires.	Zakat of 2.5% and additional taxes as applicable	Petroleum Income Tax of 55.75% for Association Agreements and 25% for PSAs	None
Cost recovery limit	N/A	80% cost recovery ceiling for PSCs	40% of annual production	Typically ranges from 50% to 65% of a project's revenue, depending on the block's potential and the development phase	75%, prior to 2023. 65%, 2023 and beyond

1	2	3	4	5	6
Profit oil split (govt/contractor)	~78% (22% CIT plus 56% special petroleum tax, i.e., 71.8% of 78%)	A biddable government profit share adjusted based on a price and production combination.	Sliding scale based on production level, crude oil price and IRR Government typically retains a bigger portion of the profit oil, often exceeding 50%.	Sliding scale based on IRR; Govt share increases with higher IRR	50% of the profit oil after cost recovery
Government take (% of revenue)	~78% (22% CIT plus 56% special petroleum tax, i.e., 71.8% of 78%)	65–75% (production sharing)	~85%	60–85%	14.5% (2% royalty plus 12.5% profit oil) before 2023. ~27.5% (10% royalty plus 17.5% profit oil), 2023 and beyond
Contractor take (% of revenue)	~22%	25–35%	~15%	15–40%	~85.5%, prior to 2023; 72.5%, 2023 and beyond
Additional notes	High government take due to combined taxes; the state holds significant equity via Equinor and SDFI.	Government takes varies, higher in pre-salt areas under production sharing agreements	High government take due to low tax rates, but significant state ownership and control over resources.	Profit oil split increases in favor of the government as the project IRR increases. For PSAs, the national concessionaire's profit-oil share is reduced to 25%, while cost-oil may be increased up to 70%.	Low government take; PSA terms considered highly favorable to contractors; subject to ongoing reviews.

Source: Authors computations from various sources (Oprea 2024; KPMG Global 2018; Nishijima et al. 2020; IMF 2024,2025; Ezenagu 2021; Energy Capital & Power 2025; Vale 2024, John 2024).

incentivize the massive capital expenditure required for technically complex ultra-deepwater and pre-salt operations.

Figure 1 complements this analysis by visualizing the estimated government and contractor take (% of total revenue) for each country, offering insights into the degree of state participation and the fiscal attractiveness of each jurisdiction to private investors. Together, these figures highlight the trade-offs inherent in fiscal policy design within the global oil and gas industry.

The quantitative estimates for Government and Contractor Take (Fig. 1) were derived using a standardized fiscal modeling approach that aggregates Royalties, Corporate Income Tax (CIT), and Special/Surtaxes. For jurisdictions utilizing Production Sharing Agreements (PSAs), such as Angola and Guyana, the “Government Take” includes the state’s share of Profit Oil after the deduction of Cost Oil. These values represent estimated averages for standard upstream projects and are grounded in secondary data from the IMF (2023–2025), EITI reports, and national petroleum statutes. It illustrates the “Fiscal Frontier” across the selected jurisdictions, revealing a distinct contrast in how different models capture resource rent.

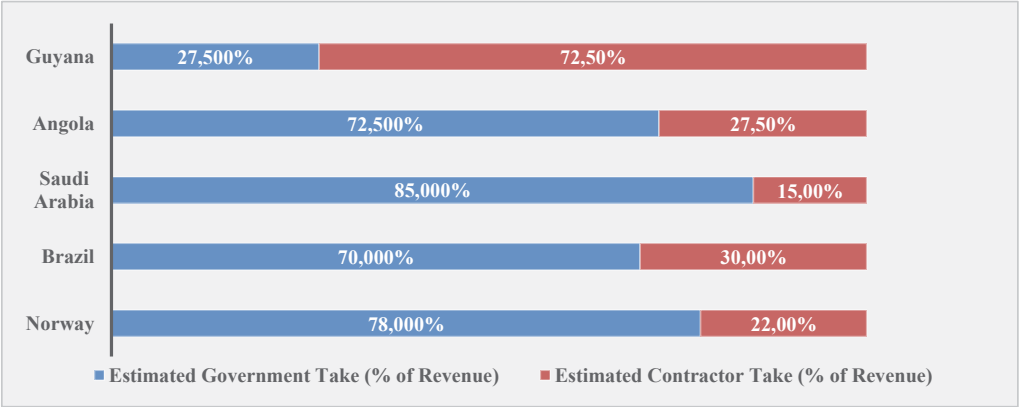


Fig. 1. Estimated government and contractors’ takes of selected countries
Source: authors compilations from various sources (Holden 2013; Norouzi and Ataei 2022; Almada and Parente 2013; Malik and Masood 2020; Alleyne et al. 2018)

Rys. 1. Szacunkowe wydatki rządu i wykonawców w wybranych krajach

The High-Rent Model, exemplified by Saudi Arabia and Norway, maintains a substantial government take ranging from 78% to 85%. This high level of rent capture is historically supported by low geological risks and significant institutional autonomy, which preserves investor confidence even when contractor margins are narrower. In stark contrast, Guyana represents an Incentive-Driven Model; its pre-2023 regime offered a 72.5% contractor take, which was the highest among the study group. The recent strategic shift in Guyana to an estimated 27.5% government take reflects a causal evolution: as a frontier market proves its hydrocarbon reserves,

it increases fiscal stringency to secure a fairer share of national wealth while maintaining a 65% cost recovery limit to sustain exploration activity.

Furthermore, Brazil and Angola occupy a “Stability Zone” as Balanced Emerging Markets, with government takes typically ranging between 60% and 75%. These jurisdictions effectively utilize Production Sharing Contracts (PSCs) to offer flexible cost-recovery mechanisms, reaching up to 80% in Brazil and which serves as a primary causal driver for attracting the massive capital investment required for technically challenging ultra-deepwater and pre-salt assets. Together, these visual data points highlight the complex trade-offs host governments must navigate between maximizing revenue and ensuring the fiscal attractiveness of their petroleum sectors.

Together, Table 2 and Figure 1 illustrate that while high-rent models like Norway and Saudi Arabia prioritize stable wealth extraction, incentive-driven and emerging models like Guyana, Brazil, and Angola focus on balancing immediate investment attraction with a progressive increase in national rent capture as the sector matures.

3. Lessons for Nigeria: insights from global oil and gas fiscal regimes

The comparative review of petroleum fiscal regimes across Norway, Brazil, Saudi Arabia, Angola, and Guyana reveals distinct governance patterns, shaped by institutional strength, revenue strategy, and regulatory discipline. The heatmap in Figure 2 offers a comparative visualization of the progress of the selected countries in this study versus Nigeria with respect to key petroleum fiscal governance principles, ranging from fiscal stability and institutional autonomy to environmental sustainability and transparency.

The Heatmap (Fig. 2) utilizes a standardized scoring system where values are assigned based on documented performance against global best practices. A score of 9–10 indicates performance aligned with global benchmarks (e.g., Norway’s GPFG), while 0–2 indicates regulatory failure or the complete absence of a framework. Where quantitative data was limited, qualitative proxies such as fiscal transparency levels and legal enforceability of contracts were employed to ensure a balanced narrative.

From the chart, Norway emerges as the global benchmark, with consistently high scores (9–10) across all indicators, indicating the strength of its regulatory institutions, mature revenue management framework, and transparent oversight mechanisms in place. Brazil and Saudi Arabia show moderate but varied strengths, excelling in areas like local content development and national oil company (NOC) efficiency, while exhibiting gaps in adaptive policymaking and institutional independence. In contrast, Angola and Guyana, as emerging and frontier producers, reveal foundational weaknesses, particularly in revenue governance, NOC commercialization, and environmental safeguards.

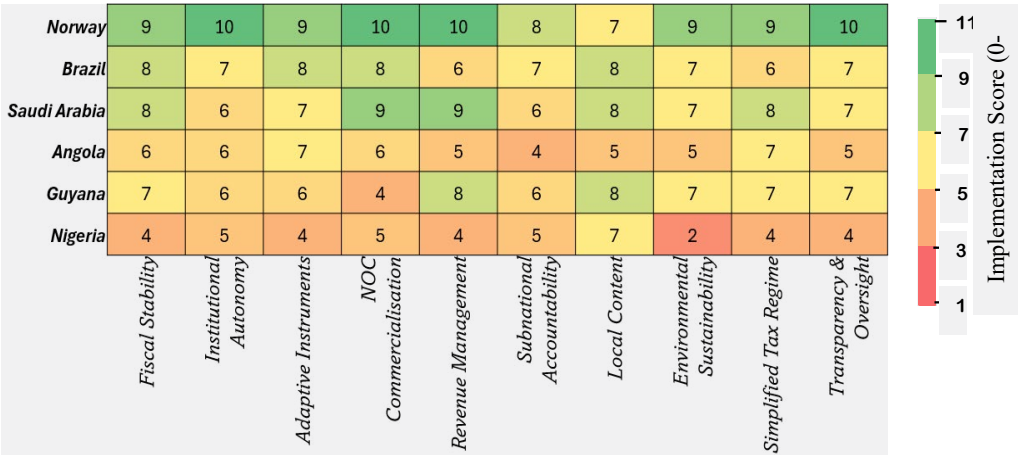


Fig. 2. Heatmap of implementation of petroleum fiscal governance lessons

Source: Authors’ assessment based on secondary data from academic literature and policy documents (2014–2024).

See Appendix for methodology. Fiscal stability and predictability

Rys. 2. Mapa cieplna wdrażania wniosków z zakresu zarządzania fiskalnego w sektorze naftowym

Nigeria, notably, ranks lowest across most categories, with scores concentrated around 4–5, and an alarmingly low score of 2 in environmental sustainability. This points to persistent governance inefficiencies, underperformance of its NOC, and limited institutional autonomy. The complexity of Nigeria’s tax regime, combined with weak subnational accountability and limited transparency, which the PIA is tackling prior to the current dispensation has historically undermined investor confidence and fiscal performance.

To address these gaps, the ten (10) consolidated lessons that follow, draw directly from this cross-country analysis and provide a roadmap for strengthening Nigeria’s petroleum fiscal framework.

A stable fiscal system that provides transparency serves as the fundamental base for maintaining investor trust and achieving maximum rent extraction. The investment environment benefits from consistent fiscal rules and limited contract renegotiation, and long-term tax stability, according to Bang and Lahn (2020), and the IMF (2022) in their studies of Norway and Saudi Arabia. The Brazilian government established competitive bidding procedures and rule-based concession systems to reduce political intervention in its operations (Mariano et al. 2018). The combination of sudden fiscal changes and political incentives, and unclear licensing procedures in Nigeria creates an environment where investors lose trust. The Petroleum Industry Act (PIA) 2021 needs to be executed without political influence, and fiscal instruments, including royalty rates and cost recovery limits and tax rates, should be applied uniformly and transparently to enhance risk-adjusted returns (Isallah 2023).

3.1. Institutional autonomy and regulatory governance

The success of fiscal oversight depends heavily on independent and competent institutions. The Norwegian Petroleum Directorate (NPD) and Petoro operate independently in Norway, protected from political interference, which enables them to maintain proper regulation and resource management (Asdal and Lahn 2024; Holden 2013). The ANP of Brazil and ANPG of Angola function with defined responsibilities that keep commercial activities separate from regulatory functions (Asanga et al. 2021; Nunes 2024). NUPRC and other sister agencies must be granted complete legal and financial independence as outline in the PIA, along with operational freedom and specialized training programs, to enhance their technical capabilities and improve performance monitoring. The implemented changes will decrease political interference while removing policy obstacles to create a governance system based on rules (Ali-Nakyea 2021; Ovadia 2014).

3.2. Adaptive and progressive fiscal instruments

Fiscal systems need to establish dynamic mechanisms that will balance state returns with investor risk. The R-factor-based PSCs of Angola modify government take according to project profitability, which protects investors from low-margin projects while maximizing state revenue from profitable projects (Echendu et al. 2015). Brazil and Guyana have modified their cost recovery thresholds and royalty rates because of changing market conditions (World Bank 2023). The PIA needs to implement profitability-linked instruments with field-specific fiscal terms for marginal assets and progressive tax designs to move past static royalty regimes. The proposed reforms would drive deepwater and frontier basin exploration while maintaining fair resource rents (Hunter 2014).

3.3. Prudent revenue management and sovereign wealth utilization

The proper utilization of petroleum revenue stands as a fundamental requirement for maintaining fiscal sustainability and ensuring intergenerational equity. The GPFG of Norway and the PIF of Saudi Arabia demonstrate disciplined savings practices through rule-based disbursement systems and long-term investment strategies (Alshahrani and Alsadiq 2014; Bang and Lahn 2020). The NRF of Guyana protects oil wealth from political pressures through its fiscal rules and oversight committees, and withdrawal caps (World Bank 2023). The NSIA and Excess Crude Account in Nigeria face underfunding and remain susceptible to improper use. The NSIA requires enhanced legal independence, increased capitalization, and investment mandates

to achieve macroeconomic stability and reduce oil revenue fluctuations while securing future development (Heiret and Innset 2025).

3.4. Sustainable development and local content integration

Local content strategies that are effective will drive industrialization and job creation. The PSCs of Angola and Brazil have enforceable incentive-based local content frameworks that balance domestic capacity development with project efficiency (Ovadia 2013; Teka 2012). The Local Content Act of Guyana has performance benchmarks, penalties, and independent monitoring mechanisms. The Nigerian Content Development and Monitoring Board (NCDMB) has a legal framework in Nigeria, but enforcement is inconsistent. Nigeria should integrate targeted metrics, third-party evaluations, and performance-based incentives to ensure local participation in supply chains, skill transfer, and technology adoption (Tordo and Anouti 2013; Warner et al. 2013).

3.5. Strategic state participation and commercialization of national oil company

The main distinction between successful oil economies stems from how professional and independent their national oil companies operate. Saudi Aramco, Petrobras, and Petoro maintain strict performance standards while making their financial information available to investors and markets (Krane 2019; Mariano et al. 2018; Norouzi and Ataei 2022). The NNPC Ltd. of Nigeria faces challenges because it operates with low productivity and financial transparency while facing political interference. The transition to a commercially oriented company needs corporate governance structures with independent boards, external audits, performance-linked remuneration, and competitive procurement systems. A leaner and more transparent NNPC Ltd. will enhance investor confidence and operational efficiency (Moshashai et al. 2018; Trudelle 2024). With the ambitious NNPC Ltd. Initial Public Offer (IPO) target set for 2028, the company is evolving with a new culture and management structure to ensure value realization for the country through strategic alliances and collaborations (Thecable 2025).

3.6. Fiscal federalism and subnational revenue accountability

The revenue-sharing systems based on constitutional frameworks in Brazil and Angola demonstrate their ability to enhance subnational development results while minimizing regional

disparities (Fjeldstad et al. 2020; Teka 2012). The Federation Account Allocation Committee (FAAC) of Nigeria distributes oil revenues without revealing its processes or using performance indicators. The reforms need to establish formula-based transfer systems that link to development metrics while performing independent audits and providing targeted capacity development for state and local governments. The system guarantees that oil revenue funds create actual improvements in education, healthcare, and infrastructure development at the local community level (Heiret and Innset 2025; Mohn 2016).

3.7. Contractual clarity and cost recovery reform

Multiple fiscal instruments that overlap with one another create barriers to investment and promote corruption. Saudi Arabia and Norway use simple tax and royalty systems that have limited discretion and high compliance rates (Lund 2014; Oprea 2024). The legacy regime of Nigeria included unclear tax regulations, together with various contract formats and complex cost recovery procedures. The PIA will achieve its full benefits through clear administrative guidelines, transparent contract terms, and strong audit mechanisms that track costs and prevent revenue leakages. The immediate needs include tax harmonization and the removal of duplicate levies and digital reporting systems (Ali-Nakyea 2021; Dike and Okparaibea 2023).

3.8. Environmental sustainability and climate-responsive policies

Environmental considerations must be central to petroleum fiscal planning. The alignment of oil revenue with climate objectives is demonstrated through Norway's carbon pricing, Guyana's Low Carbon Development Strategy (LCDS), and Saudi Arabia's Vision 2030 green investments (Bang and Lahn 2020; Bynoe and Simmons 2021; Elias-Roberts 2020; Faudot 2019). The Niger Delta in Nigeria remains plagued by environmental damage because of gas flaring, oil spills, and inadequate regulatory oversight. The implementation of green fiscal tools, including carbon taxes, clean tech incentives, and emission penalties within Nigeria's fiscal framework, will boost ESG compliance while improving environmental justice and drawing green investment flows (Okpebenyo et al. 2023; UNEP 2011).

3.9. Transparent data disclosure and civil society oversight

The legitimacy of fiscal management depends on both transparency and public accountability. Norway provides open data portals that display real-time production and revenue statistics, while Guyana also includes civil society oversight in its resource fund governance (Ali-Nakyea 2021; David 2023; Kolstad and Wiig 2009; World Bank 2023). The NEITI of Nigeria has achieved significant progress, but it does not possess the power to enforce its decisions. The reforms should require disclosure of contracts, project-by-project reporting, open budget platforms, and civil society inclusion in key decision-making processes. The ability of citizens to monitor oil flows will help fight corruption and develop inclusive governance systems (Sala-i-Martin and Subramanian 2013; Wirth and Ramírez-Cendrero 2016).

Conclusion

The analysis reveals that while resource abundance can be a catalyst for national prosperity, it is the quality of fiscal governance and institutional discipline that ultimately determines developmental outcomes. Countries like Norway and Saudi Arabia have demonstrated how strategic fiscal frameworks, combined with institutional autonomy and long-term planning, can convert volatile oil revenues into stable, intergenerational wealth.

For Nigeria, key reforms must focus on enhancing fiscal predictability, depoliticizing state-owned enterprises like NNPC Ltd., enforcing environmental and local content standards, and strengthening sovereign wealth mechanisms such as the Nigeria Sovereign Investment Authority. Lessons from countries such as Brazil and Angola highlight the importance of adaptive and transparent regulatory environments to attract sustainable investment and promote regional equity. Ultimately, Nigeria's pathway to sustainable oil and gas development lies in applying global best practices with local contextualization, ensuring that its fiscal regime evolves into a tool for inclusive growth rather than a source of economic vulnerability.

The Authors have no conflicts of interest to declare.

Appendix A: Methodology for synthesising qualitative indicators

TABLE A1: Scoring methodology for petroleum fiscal governance indicators

TABELA A1: Metodologia punktacji wskaźników zarządzania fiskalnego w sektorze naftowym

Score	Description
9–10	Strong institutional performance with documented global best practice (e.g., Norway’s GPFG, Aramco’s IPO governance).
7–8	Functional policy implementation with minor operational challenges or uneven performance (e.g., Brazil’s ANP & PPSA)
5–6	Moderate performance with mixed or inconsistent enforcement across sub-sectors (e.g., Angola’s ANPG).
3–4	Weak performance, poor enforcement, or high exposure to political influence.
0–2	Governance failure or complete absence of framework, with evidence of rent-seeking or regulatory breakdown.

The scores were assigned based on a synthesis of:

- ◆ peer-reviewed academic articles (2014–2024),
- ◆ national legislation (e.g., Norway’s Petroleum Tax Act, Brazil’s Concession Law, Nigeria’s PIA 2021),
- ◆ reports from international institutions (IMF, World Bank, NEITI, EITI),
- ◆ sovereign wealth fund reports and NOC annual filings,
- ◆ country case study analyses and petroleum fiscal reviews.

To improve reliability and reduce bias, each score was validated using a three-point triangulation approach:

1. **Academic evidence** from peer-reviewed journals and oil governance literature;
2. **Policy documents**, including country regulatory reports, audit reviews, and international agency publications;
3. **Institutional performance records**, such as sovereign wealth fund reports, national budget performance, and ESG compliance disclosures.

Where direct quantitative measures were not available, scores relied on credible qualitative proxies such as the level of fiscal transparency, legal enforceability of contracts, and frequency of policy reversals.

This methodology offers a defensible, policy-informed synthesis of global practices in petroleum fiscal governance, adapted to the Nigerian reform context.

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Globalny przegląd systemów podatkowych w sektorze naftowym i gazowym: wnioski dla Nigerii

Streszczenie

Sektor naftowo-gazowy pozostaje głównym filarem gospodarki Nigerii, generując około 65% dochodów budżetowych i ponad 85% całkowitego eksportu. Pomimo bogatych zasobów krajowe ramy fiskalne borykają się z głęboko zakorzenioną nieefektywnością, słabym zarządzaniem oraz znaczną zmiennością dochodów. Niniejsze badanie ocenia systemy podatkowe dotyczące ropy naftowej w pięciu jurysdykcjach – Norwegii, Brazylii, Arabii Saudyjskiej, Angoli i Gujanie – z wykorzystaniem dziesięciu wskaźników zarządzania, w celu wyciągnięcia wniosków dotyczących polityki dla Nigerii. Rygorystyczna analiza porównawcza ujawnia znaczne różnice w udziale państwa w zyskach, autonomii instytucjonalnej oraz skuteczności regulacyjnej.

Wyniki wskazują, że Norwegia stanowi światowy wzorzec, osiągając wysoką krańcową stawkę podatkową na poziomie 78% oraz dysponując funduszem majątkowym przekraczającym 1,4 bln USD, co potwierdzają oceny wdrożenia na poziomie 9–10. Natomiast niedawne reformy w Gujanie zwiększyły udział państwa w zyskach z 14,5% do około 27,5%, co świadczy o udanej ewolucji rynku wschodzącego. Arabia Saudyjska stanowi wzór stabilności dzięki progresywnej, ruchomej skali opłat eksploatacyjnych, sięgającej 80%, gdy ceny ropy przekraczają 100 USD za baryłkę.

Z kolei Nigeria zajmuje najniższe miejsce, uzyskując wyniki w przedziale od 4 do 5, a w zakresie zrównoważonego rozwoju środowiskowego osiąga krytycznie niski wynik 2. W badaniu stwierdzono, że w celu optymalizacji ustawy o przemyśle naftowym (PIA) z 2021 r. Nigeria musi wprowadzić instrumenty oparte na współczynniku R powiązanym z rentownością, podobne do tych stosowanych w Angoli, aby zrównoważyć zyski państwa z ryzykiem ponoszonym przez inwestorów. Zalecenia obejmują przyznanie NUPRC pełnej niezależności finansowej oraz wdrożenie ekologicznych narzędzi fiskalnych, takich jak podatki od emisji dwutlenku węgla, w celu poprawy zgodności z zasadami ESG i dostosowania się do globalnych celów transformacji energetycznej. Ten plan reform ma kluczowe znaczenie dla przekształcenia bogactwa węglowodorowego Nigerii w siłę napędową wzrostu sprzyjającego włączeniu społecznemu.

SŁOWA KLUCZOWE: polityka energetyczna, system podatkowy, zarządzanie energią, zrównoważony rozwój środowiskowy, ocena porównawcza

